

REMARKS

The specification and claims have been amended in the attached Preliminary Amendment. All amendments have been made to place the application in proper U.S. format and to conform with proper grammatical and idiomatic English. None of the amendments herein are made for reasons related to patentability. No new matter has been added.

In the event the U.S. Patent and Trademark Office determines that an extension and/or other relief is required, applicant petitions for any required relief including extensions of time and authorizes the Commissioner to charge the cost of such petitions and/or other fees due in connection with the filing of this document to **Deposit Account No. 03-1952** referencing docket no. **449122084800**. However, the Commissioner is not authorized to charge the cost of the issue fee to the Deposit Account.

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Respectfully submitted,

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Description

**METHOD AND DEVICE FOR INTERMEDIATE STORAGE OF SUBSCRIBER
DATA DURING A RELOCATION OF A MOBILE SUBSCRIBER WITHIN A
MOBILE COMMUNICATION NETWORK**

5 CLAIM FOR PRIORITY

This application is a national stage of PCT/EP2004/050613
which was published on November 18, 2004 and which claims
the benefit of priority to German Application No. 103 19
982.9 filed May 5, 2003.

10 TECHNICAL FIELD OF THE INVENTION

The invention relates to a method and a device for
intermediate storage of subscriber data during a
relocation of a mobile subscriber within a mobile
communication network.

15 BACKGROUND OF THE INVENTION

In the course of a relocation of a UMTS/GPRS mobile radio
subscriber in some case the packet switch routing the
traffic (SGSN = Serving GPRS Support Node) has to be
changed. The extract from the Standard (3GPP TS 23.060)
20 shown schematically in Figure 1 presents the situation
schematically.

Figure 1 shows the forwarding of subscriber data (user
data routing), if the Serving Radio Network Controller
(SRNC =) and the Target Radio Network Controller (TRNC =
25) are connected to different network nodes (SGSN =
Serving GPRS Support Node) which support the GPRS
(General Packet Radio Service) before a relocation (SRNS
= Serving Radio Network Subsystem Relocation) takes
place. Figure 2 shows the forwarding of subscriber data

after the procedure "SRNS Relocation" and when the procedure "Routing Area Update" is ended. In the case shown the mobile station (MS) is in the status "PMM-CONNECTED".

- 5 Before the procedure "SRNS Relocation" and "Routing Area Update" the mobile station is registered at the "old" SGSN. The origin RNC operates as serving RNC. After the procedures "SRNS Relocation" and "Routing Area Update" (RA = Routing Area) - as indicated in Figure 2 - the
10 mobile station is registered at the "new" SGSN. The mobile station is in the status "PMM-CONNECTED" in relation to the new SGSN and the destination RNC operates as serving RNC.

- In this case there is a "hole", in which data is already
15 being transmitted over the new connection (Message 7 in Figure 3), although the subscriber is not yet known there. In itself this is no problem for the data transmission and is of no significance, for Lawful
Interception (LI) however it produces a problem since it
20 can only be decided when the subscriber data has been completely transmitted (message block 14 in Figure 3) whether the subscriber is to be subject to surveillance or not. However in previous methods data had already been transmitted which is then lost for surveillance.

25 SUMMARY OF THE INVENTION

~~The object of the invention is to overcome the disadvantages described above.~~

- ~~The object is achieved by the features of a method and a network node in accordance with the independent patent
30 claims. Advantageous developments of the invention are identified in further independent patent claims.~~

~~An important aspect~~In one embodiment of the invention,
~~there is a comprises~~ method for intermediate storage of
 data packets during a relocation of a mobile subscriber
 within a communication network, with the data packets,
 5 once the data transmission path has moved from a
 switching network node originally responsible for the
 subscriber to a switching network node which is to become
 responsible for the subscriber are stored in the last
 switching network node until the subscriber data provided
 10 for the new data transmission path is located in the last
 switching network node.

~~A further aspect of the invention consists of the~~In
~~another embodiment, there is of~~ a network node suitable
 for intermediate storage of data packets during a
 15 relocation of a mobile subscriber within a communication
 network featuring ~~means~~ a device for intermediate storage
 of data packets after the data transmission path changes
 from a switching network node originally responsible for
 the subscriber to the ~~said~~ the network node, until such
 20 time as the subscriber data provided for the new data
 transmission path is available.

BREIF DESCRIPTION OF THE DRAWINGS

~~Further details of the invention are explained on the~~
~~basis of an exemplary embodiment with reference to a~~
 25 ~~drawing. The Figures show:~~The invention is described
below in more detail with reference to exemplary
embodiments and the figures, in which:

Figure 1 ~~as described above~~ a schematic shows a
 network layout for routing subscriber data.

30 Figure 2 ~~as described at the start~~ a schematic shows a
 network arrangement after the end of the relocation

procedure, ~~and~~

Figure 3 a message flow diagram for the above-mentioned relocation procedure.

DETAILED DESCRIPTION OF THE INVENTION

5 Figures 1, 2 described at the beginning of this document are schematic diagrams of network arrangements with interlinked network elements HLR/AuC, GGSN, old MSC/VLR, old SGSN, new SGSN, new MSC/VLR: source (S)RNC, target (S)RNC, MS (mobile station), LA1 (LA2 = Location Update),
10 LA2 RA1 (RA = Relocation Update), RA2. The reference symbol correspond to the abbreviations for mobile radio network elements normally used in mobile radio technology. The broader lines show the connection from the mobile stations MS through the communication network.
15 These same reference symbols/abbreviations are used in Figure 3. The message transmitted between the network elements are identified by numbers and abbreviations which are fixed expressions normally used in conjunction with mobile radio networks.

20 In Figure 3 the solution now makes provision, in an earlier phase of each relocation procedure to introduce at the new SGSN a buffering or intermediate storage of packets, regardless of whether the relevant subscriber is subject to surveillance or not, since this information is
25 not yet available. Possible trigger points for the buffering of the data would be the messages "Forward Relocation Request" (3), "Relocation Request Acknowledge" (4) and "Relocation Detect" (9). The message actually used to trigger the buffering depends on the
30 implementation, however the ready-to-store state should be established as early as possible.

The information as to whether surveillance is actually to be undertaken is not available until the end of the relocation procedure within the following RAU procedure (14) (RAU = Relocation Area Update) if the user data was

5 transmitted. Up until that point all packets are buffered. If the subscriber is to be subject to surveillance his packets are not lost and can be further evaluated. If he is not to be subjected to surveillance, the packets are discarded. (after message block 14 in

10 Figure 3) the average duration of the process amounts to appr. 5700 ms, for safety reasons the solution has been dimensioned so that a buffer time of 15 is retained to ensure that no data is lost even with delays.